ANUSHRI ARORA

Department of Computer Science, Princeton University

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Education

Princeton University New Jersey, NJ **Aug 2023 - Present**
PhD in Computer Science – Jonathan Pillow (advisor)

Columbia University New York, NY **Jan 2020 - May 2021**
Master of Science in Computer Science – Machine Learning Track

Mukesh Patel School of Technology Management & Engineering, Mumbai, India **July 2015 - April 2019**
Bachelor of Technology in Computer Engineering

Professional Experience

Basis AI, Boston **Summer 2026**

Research Intern Dynamical Systems team. Mentor: Mathew Levine

- Developed a continuous-discrete dynamical model to infer social behavior from video and audio recordings of a family of Mongolian gerbils.
- Contributed to open source libraries: *dynestyx* (NumPyro-based Bayesian inference for dynamical systems) and *cd_dynamax* (continuous-discrete filtering and smoothing).

Research Experience

Pillow Lab, Princeton University, Princeton, NJ **Aug 2023 – Current**

Ph.D. Candidate – Dr. Jonathan W. Pillow

- Developing theory driven methods for learning and controlling nonlinear dynamical systems (with a focus on interpretable low-rank RNNs inspired by neuroscience).
- Currently working on combining control theory/RL with Bayesian experimental design for data-efficient training of neural networks.
- In collaboration with *Ben Eysenbach and Nathaniel Daw*: Building a Bayesian adaptation to successor representations, which can operate under partial observability and efficiently solve deep-exploration problems.

Landau Lab, New York Genome Center, New York, NY **June 2021 – June 2023**

Machine Learning Research Analyst – Dr. Dan Landau

- Developed & evaluated deep learning models and pipelines for ultra-sensitive detection of circulating tumor DNA (ctDNA) from cell-free DNA molecules obtained through novel sequencing technologies.

Pe'er Lab, Columbia University, New York, NY **Jan 2020 – Dec 2020**

Graduate Research Assistant – Dr. Itsik Pe'er

- Designed a deep graphical model for inferring stochastic spatial & temporal bacteria-tumor interactions from video sequences.

IIT Bombay- CFILT (Center for Indian Language & Technology) Lab, India **June 2019 – Dec 2019**

NLP Research Intern - Dr. Ganesh Ramakrishnan & Dr. Sunita Sarawagi.

- Created and deployed an LSTM model to achieve real time complaint & sentiment classification for government funded organizations (CIVIS & I Change My City) with over 100,000 users .

Publications

Journal Articles:

- Cheng, A. P.*, Widman, A. J.*, **Arora, A.***, et al. & Landau, D. A. (2025). Error-corrected flow-based sequencing at whole-genome scale and its application to circulating cell-free DNA profiling. *Nature Methods,* 1-9.
- Frydendahl, A., Widman, A. J., Øgaard, N., **Arora, A.,** et al. & Andersen, C. L. (2025). Whole‐genome sequencing of cell‐free DNA reveals DNA of tumor origin in plasma from patients with colorectal adenomas. *Molecular Oncology,* 19(4), 984-993.

- Widman, A. J., Shah, M., Frydendahl, A., Halmos, D., Khamnei, C. C., Øgaard, N., Rajagopalan, S., **Arora, A.**, et al. & Landau, D. A. (2024). Ultrasensitive plasma-based monitoring of tumor burden using machine-learning-guided signal enrichment. *Nature medicine,* 30(6), 1655-1666.

Conference Proceedings:

- **Arora, A.,** Peterson E.R, Batenkov B., Mackevicius E.L, Waxman D., Levine E.M. (2026). A Continuous-Discrete Switching Dynamical Model for Multi-Agent Interactions. *AI for Stochastic Dynamics: From Theoretical Foundations to Scientific Applications, Workshop NeurIPS (accepted).*
- Arbelaiz J.,**Arora, A.,** Pillow J.W. (2026). Information-theoretic receding-horizon active learning of nonlinear dynamical systems. *In Proceedings* of *65th IEEE Conference on Decision and Control (CDC – accepted)*
- **Arora, A.,** Pillow J.W. (2025). Efficient Training of Minimal and Maximal Low-Rank Recurrent Neural Networks. *In Proceedings* of *Advances in Neural Information Processing Systems (NeurIPS)*
- **Arora, A.**, Harimoto T., Danino T., Pe'er I. (2020). Spatial Microbial Dynamics. *In Proceedings of Machine Learning in Computational Biology (MLCB)*
- **Arora, A.**, Joshi, A., Jain, K., Dokania, S., & Srinath, P. (2018). Unraveling depression using machine intelligence. *In Proceedings* of *3rd International Conference on Communication and Electronics Systems (ICCES)* (pp. 1029-1033). IEEE.
- **Arora, A.**, & Chandratre, A. (2018). Optical Character Recognition For Handwritten Forms With Dynamic Layout. *In Proceedings* of *4th International Conference on Applied and Theoretical Computing and Communication Technology (iCATccT)* (pp. 299-303). IEEE

Conference Abstracts:

- **Arora, A.,** Pillow J.W. (2025). Efficient methods for minimal and infinite low-rank recurrent neural networks. *Computational and Systems Neuroscience (COSYNE).*
- Arbelaiz, J., **Arora, A.,** Pillow J.W. (2025). A control-theoretic approach to active learning of nonlinear neural dynamics. *Computational and Systems Neuroscience (COSYNE).*

* These authors contributed equally.

Awards And Honors

- NeurIPS 2025 Scholar Award
- Meritorious grade awardee: Top 5% CGPA of Undergraduate Cohort.
- Winner Mastek's Deep Blue Hackathon 2018 - Created a localized zonal method of processing tagged form fields. Used CNNs for text recognition. (Cash prize of INR 100,000)
- Winner Royal Academy of Engineering, UK - MPSTME Tech Challenge 2018 - Developed a face recognition classifier for a custom dataset (Cash prize of INR 100,000).
- First runner up for the best use of Matlab & Simulink (2016 & 2017) - National robotics competition: Asia Pacific Broadcasting Unit (ABU) – Robocon.

Academic Service

- Reviewer for ICLR, NeurIPS
- Co-organized a workshop on "Causal perturbation-based approaches to uncover neural dynamics" at COSYNE 2025.
- Teaching Assistant, COS 513, Foundations of Probabilistic Modeling, Princeton University, Spring 2025
- Teaching Assistant, COS 350, Ethics of Computing, Princeton University, Fall 2024
- Teaching Assistant, CS 4761, Computational Genomics, Columbia University, Fall 2020
- Research mentor for PNI-supported program for undergraduate students from under-represented backgrounds (Summer 2024)